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2 September 1977

TRANSLATIONS ON EASTERN EUROPE

SCIENTIFIC AFFAIRS

No. 558

EAST EUROPE

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CONTENTS PAGE

COOPERATION BETWEEN BULGARIAN, SOVIET SCIENTIFIC INSTITUTES

Sofia RABOTNICHESKO DELO in Bulgarian 20 Jul 77 p 4

[Article by Corresponding Member Prof Dr Veselin Petkov, director of the Bulgarian Academy of Sciences Institute of Physiology: "True Path to Success"]

> [Text] The tremendous successes achieved by Soviet science have always been a guiding star to our scientists. This has been particularly clear in the fields of medicine and biology in which, for a number of years, there has been fraternal cooperation in promoting the health of the people. With this article by Corresponding Member Dr Veselin Petkov, in honor of the 60th anniversary of the Great October Revolution, we are beginning the publication of a series of articles on cooperation between Bulgarian and Soviet scientists. The authors will include some of the most noted representatives of medical-biological scientific thinking in Bulgaria.

Throughout its existence the Bulgarian Academy of Sciences Institute of Physiology developed on the basis of the positions of the Soviet school of physiology. It made extensive use of the experience and direct assistance of Soviet physiologists.

The problem group on motion control has enjoyed many years of fruitful cooperation with the laboratory of motion physiology of the Physiology Institute of the USSR Academy of Sciences in Leningrad and the laboratory for motion control of the institute of data processing problems of the USSR Academy of Sciences in Moscow.

For the past 2 years, together with the Leningrad institutes, along the CEMA line, work has been done on "Studies in the Field of Bionics." Also along the CEMA line our institute is developing methods to assess muscular fatigue of operators as well as the method for transmitting bioelectric control signals to robots. Further specifications will be provided for a design for a system which will use a method developed by our group for assessing fatigue. According to the preliminary stipulation the system itself will be developed in the USSR.

For many years our problem group on visual data processing has maintained relations with the Institute of Physiology imeni I. P. Pavlov of the USSR Academy of Sciences in Leningrad. As a result of the joint research work two collections of scientific works were published, one in Leningrad in 1970 and the other in Sofia in 1974. Other joint scientific studies were published as well. Close scientific relations exist between the problem group on visual data processing and the Institute of Psychology of the USSR Academy of Sciences in Moscow. Good cooperation exists between our institute and the Department of Psychology of Moscow State University.

The institute's section on vegetative control is in close scientific contact and develops common problems with the Institute of Physiology imeni I. P. Pavlov, of the USSR Academy of Sciences in Leningrad, and the Institute of Physiology of the Ukrainian Academy of Sciences imeni Bogomolets in Kiev. The institutes conducts joint studies on the role of some brain structures in regulating the digestive and cardiovascular systems with the Leningrad Institute of Physiology.

Together with the Kiev Institute of Physiology, along the CEMA line, work is being done on "Muscular Contraction Mechanisms." In the course of the work a number of associates from our institute mastered and, subsequently, applied in the Bulgarian Academy of Sciences microelectrode instruments for leading out potentials from isolated smooth muscle cells, a method for recording post-synaptic potentials, a method for simultaneous recording of mechanical and electrical activities of smooth muscles, and others. The section also maintains scientific contacts with the Institute of Physiology at the State University in Kiev and the physiology department of the Sanitation and Hygiene Institute in Leningrad.

Based on an Intermozg assignment, the Bulgarian Academy of Sciences Institute of Physiology is working on a joint topic with the Soviet Brain Institute. Here again, scientific associates were exchanged in the course of the work.

The Comparative Physiology section of our institute is maintaining scientific contacts with the Institute of Physiology of the USSR Academy of Sciences in Leningrad, the Institute of Evolution Physiology and Biochemistry of the USSR Academy of Sciences in Leningrad, the Institute of Physiology of the Belorussian Academy of Sciences in Minsk, and the Institute of Physiology of the Ukrainian Academy of Sciences in Kiev. The methods mastered in the course of the specialization of the section's associates in these institutes played a substantial role in raising research work to a higher level.

The Section on Pharmacological Influences on Regulatory Mechanisms in the Organism maintains scientific contacts with the Institute of Pharmacology of the USSR AMN [Academy of Medical Sciences] in Moscow. We developed some elements of the mechanism of action of the exceptionally active original preparation against coronary disease (angina pectoris) called nonakhlazin, developed by the Soviet Institute of Pharmacology. We maintain good scienctific contacts with the laboratory for evolution

pharmacology of the Institute of Evolution Physiology and Biochemistry of the USSR Academy of Sciences in Leningrad in the study of typological, age, and sex differences in the effect of drugs, and with the Institute of Organic Synthesis of the Latvian Academy of Sciences in Riga. The pharmacologists in our institute studied original [angiotensine] derivates synthesized at the Riga institute. We maintain contacts with the All-Union Institute for Medicinal Plants near Moscow and the Insitutue for biologically active substances of the Far Eastern Branch of the Siberian Department of the USSR Academy of Sciences related to the study of medicinal plants. The head of the section on pharmacological influences on regulatory mechanisms coordinates the studies conducted by all socialist countries, including the USSR, on the pharmacological study of nervous activities and mechanisms of action of neurotropic medicines based on the Intermozg program.

The book "Phytotherapy" by Adacemician D. Yordanov, Corresponding Member P. Nikolov and Prof A. Boychinov has been published in several big printings in Russian. The monograph by Corresponding Member Prof V. Petkov "Lekarstvo, Organizum, Farmakologichen Efekt" [Drug, Organism, Pharmacological Effect] was also published in a big edition in Russian.

Our institute's section on bioenergetics is working jointly with the Institute of Biophysics of the USSR Academy of Sciences, the Second Moscow Medical Institute, and the Department of Membrane Physical Chemistry of Moscow State University on "Biophysical Studies."

The problem group on control of basic nervous processes of the Institute of Physiology of the Bulgarian Academy of Sciences is maintaining fruitful scientific contacts and is engaged in joint scientific studies (mainly through Intermozg) with the Institute of Physiology of the Georgian Academy of Sciences (Tbilisi), the Institute of Physiology of the USSR Academy of Sciences in Leningrad, and the Institute of Higher Nervous Activities and Neurophysiology of the USSR Academy of Sciences in Moscow.

Let me stress with particular gratitude the great assistance which the Institute of Physiology of the Bulgarian Academy of Sciences is receiving through visits paid by most noted Soviet physiologists and pharmacologists. To a large extent the experimental skills of our associates and their opportunities for the theoretical interpretation of experimental data were developed as a result of their contacts with noted Soviet physiologists and pharmacologists who visited the institute such as Academician V. N. Chernigovskiy, Corresponding Member Ye. A. Asratyan, Academician P. K. Anokhin, AMN Academician S. V. Anichkov, AMN Academician V. V. Zakusov, AMN Corresponding Member M. D. Mashkovskiy, AMN Corresponding Member G. N. Pershin, and others.

We shall never forget what these and many other Soviet physiologists and pharmacologists have done for the building and development of our institute and for the growth of each one of us. Today, under circumstances marked by the real triumph of Bulgarian-Soviet friendship, following the

visit which the Bulgarian party and government delegation, headed by Comrade Todor Zhivkov, paid to the Soviet Union, new prospects and possibilities opened for even closer integration of research in the field of the physiological sciences between the scientists of our two countries. This is the true way to reaching unparalleled successes by our scientists working in this important scientific field.

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CSO: 2202

ACTIVITIES OF PETROLEUM SCIENTIFIC INSTITUTE REPORTED

Sofia KHIMIYA I INDUSTRIYA in Bulgarian No 5, 1977 pp 214-215

[Interview with Sava Karaenev, director of the Institute for Petroleum Refining and Petrochemistry in Burgas conducted by Iv. Pavlova: "The Burgas Petroleum Refining and Petrochemical Institute Helps Production Work"]

[Text] The Burgas Petroleum Refining and Petrochemical Institute is the only institute in Bulgaria whose scientific research and applied and development activities serve this important national economic sector. It employs 366 higher and secondary cadres, 78 of whom are scientific associates (including 4 candidates of technical sciences and 1 senior scientific associate second grade). Twenty-one scientific associates are upgrading their skills as postgraduate correspondence students.

The institute conducts integrated activities with units of the VKhTI [Higher Chemical Technology Institute] in Sofia, the VKhTI in Burgas, and the Bulgarian Academy of Sciences. It also maintains contacts with a number of domestic and foreign institutes.

I asked Comrade Sava Karaenev, director of the Institute of Petroleum Refining and Petrochemistry, to describe in their essential lines the activities of the institute and the extent to which they are contributing to the solution of production problems at the Petrochemical Combine in Burgas.

"The activities of our institute," said Comrade Karaenev, "are directed mainly toward the following: petroleum refining and petrochemical synthesis; synthesis of polymers, elastomers, and staples; anticorrosion protection and treatment of industrial waters. The basic research activities are assisted by a number of auxiliary units: analysis instrument methods; structural analysis; technical and economic studies and forecasting; scientific and technical and patent information; standardization; electronics; experimental base; and planning-design bureau.

"The 'petroleum refining and petrochemistry' activity makes extensive use of scientific and technical achievements in the use of new and effective technologies, intensification and modernization of existing production facilities for fuels and petroleum products, and improving their quality and expanding their variety.

"The 'polymers' line works on upgrading the effectiveness in the production of polymers, elastomers, and staples, the creation of new modern production technologies, the expansion of variety and improving the characteristics of polyolefines, polystyrene, and copolymers, butadiene-styrene resin and latexes, and polyacrylic staples.

"The Anticorrosion Protection Section chooses suitable construction materials for the petroleum refining and petrochemical industries and develops technologies for the synthesizing of inhibitors and the use of anticorrosion lining.

"The section on 'Water Treatment and Environmental Protection' focuses its activities on the purification of industrial sewage waters and water supplies to petroleum refining and petrochemical installations. It develops technologies for the treatment and utilization of treated sewage waters.

"The section on 'Instrumental Methods and Structural Analysis' uses modern methods and apparatus for the study and testing of organic and inorganic products both for scientific research and for production at petroleum-refining and petrochemical installations."

Going up to the director's office, I read the following in the lobby of the second floor:

"Joining the initiative 'From High Quality of Individual Work to High Quality of Joint Labor,' the collective of the Burgas Institute of Petroleum Refining and Petrochemistry

"Pledges:

"1. To apply 12 topics in 1977.

"2. To reach returns of 5.6 leva per leva expenditures for scientific research.

"3. To reduce the application time for six topics in the 1977 plan by an average of 1 quarter."

I asked Comrade Karaenev to describe some of the developments achieved by the Institute of Petroleum Refining and Petrochemistry.

[Answer] We have developed and applied new and effective technological systems for the production of high-octane gasoline, diesel and marine fuels, dichloroethane, ABC-copolymers, foam styrene, high styrene rubber, latexes for the lacquer-painting industry, inhibitors for corrosion protection in the processing of MAK-4 sulfur petroleum and of I-7 for use in cooling waters, antifreeze, biochemical treatment of sewage waters, and many others.

As a result of the institute's developments, we modernized and intensified basic production processes for catalyitc reforming, low-density polyethylene, and high-density polyethylene; the quality indicators of many products were improved, and use was found for some petroleum-refining and petrochemical waste.

A number of original methods were developed for analyses, standards, and recommendations; scientific and technical, economic, and patent information was collected and processed; concepts and forecasts on the future development of the sector were drawn up.

[Question] What have the economic results of the institute's scientific research been?

[Answer] In the Sixth Five-Year Plan we applied 53 topics with economic results totaling 16.5 million leva based on factual profits, with a return coefficient of funds spent for scientific research and development equaling 2.68.

In 1976 12 topics were applied with economic results totaling 7,865,000 leva based on factual profits with a 6.88 return coefficient.

Our work in the Seventh Five-Year Plan will be directed mainly on the following:

Modernization, intensification, and reconstruction; creation of new and improvement of existing technologies and goods;

Deep processing of raw materials and utilization of auxiliary and waste products;

Natural and environmental protection;

Protection of equipment from corrosion.

We expect savings totaling about 39 million leva with a 5.83 return coefficient.

The common work grounds shared by the Petrochemical Combine and the Institute for Petroleum Refining and Petrochemistry in Burgas, the joint discussion of problems, and the knowledge of the production process by specialists some of whom are former production workers contribute to the high results.

The institute's specialists have been awarded 53 authorship certificates approved by the institute for rationalizations, and are the authors of over 400 publications in Bulgarian and foreign periodicals. They have extensively participated in scientific and technical conferences in Bulgaria and abroad. The institute publishes the periodical NEFT I KHIMIYA, which is a serious rostrum for the formulation and discussion of a number of important scientific and technical problems in the field of petrochemistry. Through its overall activities the institute tries to link ever more closely theory with practice in order to help production work which faces important tasks set by the party and the government for the Seventh Five-Year Plan.

5003
CSO: 2202

NEW PRODUCTS OF BURGAS OIL REFINERY

Sofia KHIMIYA I INDUSTRIYA in Bulgarian No 5, 1977 pp 215-216

[Article by St. Atanasova: "New Bulgarian Output"]

[Text] The petrochemical industry plays a particular role in the development of Bulgarian chemistry in the Seventh Five-Year Plan. The Council of Ministers Bureau is supervising six target projects for 1977 on the territory of the Burgas Petrochemical Combine alone. Four of them are novelties in the development of petroleum refining and petrochemistry in our country. The petrochemical collective in Burgas completed the first quarter of the year by launching two new highly effective production facilities, for the production of highly concentrated latexes, and for the isomerization of normal pentane.

Only 3 years ago a license was purchased from Contractors John Brown, a British company, by decision of the Council of Ministers Bureau. The purpose was to develop in Bulgaria the production of highly concentrated latexes. Specialists from the Neftokhimproekt KIPP [expansion unknown], the Synthetic Rubber Plant and company representatives were able to deliver the project within the shortest possible time. It was carried out by the construction and installation workers who completed the installation 10 months ahead of the initial completion deadline. The installation for highly concentrated latexes is already operating regularly. The first production results have outstripped our expectations. Bulgaria has become one of the few countries producing highly concentrated latexes.

This new petrochemical product will be extensively applied in the production of foam resin goods, in the textile industry, the manufacturing of consumer goods, and others. The capacity of the new installation offers factual possibilities for the full satisfaction of the country's needs for highly concentrated latexes and for export. On the basis of polystyrene strengthening latex the facilities can produce nearly all types of highly concentrated latex and meet the tastes and requirements of even the most demanding consumers. At present it is producing Inteks-100 (without polystyrene strengthening latex), and Inteks-105.

The need for making full use of all semifinished products in petroleum refining and for upgrading the quality of finished products with a view to meeting modern requirements in the development of the petroleum-refining industry called for the construction of a system for the isomerization of normal pentane at the Burgas Petrochemical Combine. Based on data of USSR operating installations and after consultations with Soviet specialists, the collective of the Neftokhimproekt KIPP, headed by chief designer engineer Khristina Uzunova developed the draft of the new installation included in the third expansion of the petroleum refinery. The main feature which makes it different from the Soviet installations is the different composition of the installation's initial processing raw material and its productivity.

With this new expansion of the Burgas Petrochemical Combine Bulgaria becomes the second country within the CEMA system to have such a production facility. It will produce about 140,000 to 150,000 tons of isopentane, about 4,000 tons of isohexane, and over 100,000 tons of propane-butane per year from the processed NK-62 fraction.

Isopentane and isohexane, whose octane numbers are, respectively, about 90 and 78-80, will be used as high-octane gasoline additives. Their use as components will improve the quality of engine gasolines, will lower their tetraethyl content and, in the case of some gasolines, will eliminate it entirely, as is being done in Moscow, Kiev, and Leningrad, with a view to lowering automobile air pollution.

The commissioning of this new production facility represents yet another decisive step toward drastically upgrading the quality of domestic gasolines and a guarantee for future successes in the struggle for environmental protection.

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RADIO COMMUNICATION EQUIPMENT DESCRIBED

Sofia VOENNA TEKHNIKA in Bulgarian No 5, 1977 p 17

[Unattributed article: "The 'Len' Radio"]

[Text] The USW "Len" radio, developed by Bulgarian and Soviet specialists, is on view at the 23d International Plovdiv Fair.

The "Len" is a representative of the new generation of radio sets intended for the organization of two-way radiotelephone communication in the dispatcher systems of the various sectors of the national economy. It can provide simplex communication with the same-type radio sets operating on the same frequency under the following operating conditions: routine reception, reception of conference voice-frequency call, sending of conference voice-frequency call, conversations (reception-transmission). It has a logical illuminated display, which gives information about five states, including indication of unserviceability of the antenna-feeder system.

The "Len" radio possesses electric parameters and climatic and mechanical stability which satisfy, by a large margin, the specifications of Bulgarian State Standard 7652-73 and Bulgarian State Standard 10652-73, as well as Soviet State Standard 12252-66 and State Standard 16019-70.

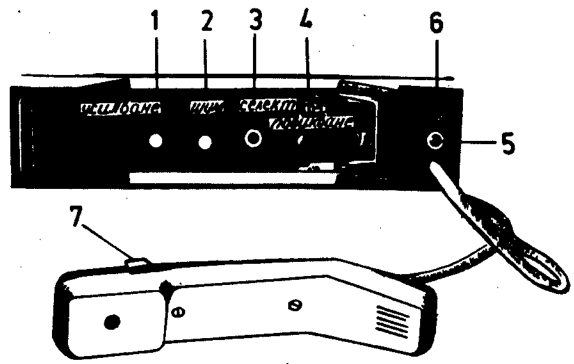
The frequency range of the radio is from 33 to 46 MHz, the channel separation being 25 kHz. Frequency instability is less than $20 \cdot 10^{-6}$. It can operate at a temperature from -25° to $+50^{\circ}$ C.

The output power of the transmitter is 10 ± 2 W. Its stray radiation is less than 25 micro V. Receiver sensitivity at 12 dB SINAD [expansion unknown] is less than 0.7 micro V.

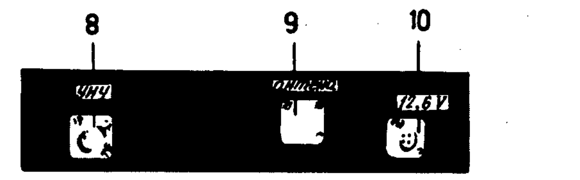
The radio set is powered with 12.6 V voltage (from min 10.5 to max 16 V), with maximum consumption during routine reception being 0.15 A, during reception 0.5 A, and during transmission 2.5 A.

Dimensions of the transceiver are 240x220x53 mm; its mass is less than 3 kg, while dimensions of the loudspeaker unit are 95x110x50 mm, and its mass is less than 0.6 kg.

a



b



1. On-off knob of radio set and low-frequency amplification
2. On-off knob and noise-suppressor control
3. On-off switch of selective system
4. Conference selective call button
5. Green reception indicator
6. Red transmission indicator
7. Transmission button
8. ULF coupling for switching on loudspeaker unit
9. Antenna coupling
10. 12.6 V coupling for connecting power-supply cable.

Key:

a. Front view
b. Rear view

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BULGARIA

TRANSISTOR PARAMETERS LISTED

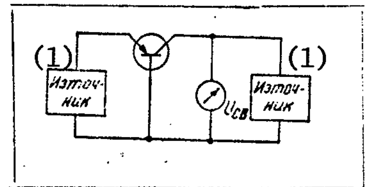
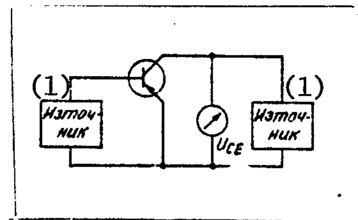
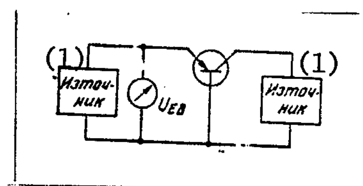
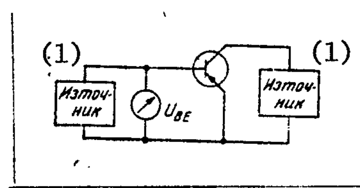
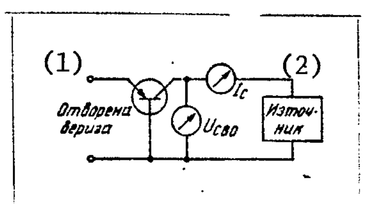
Sofia RADIO, TELEVIZIYA, ELEKTRONIKA in Bulgarian No 4, 1977 pp 31-32

[Article by T. Moskov and G. Kondarev: "Transistors"]

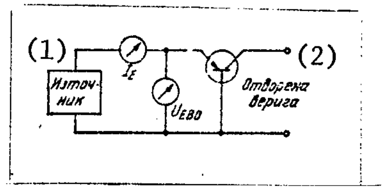
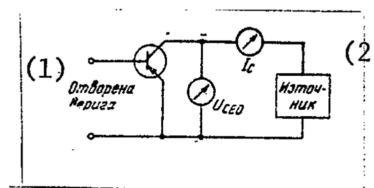
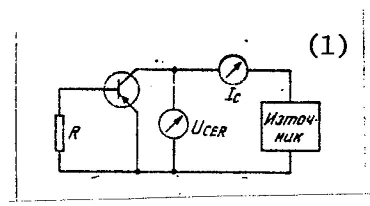
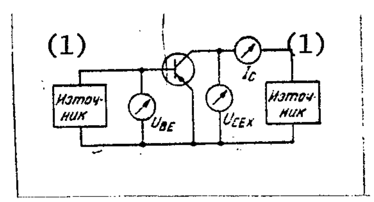
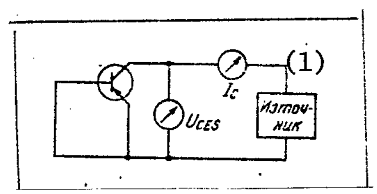
[Text] Temperature Parameters

$t_{a(amb)}$	Ambient temperature	
$t_{c(case)}$	Case temperature	
t_j	Junction temperature	
t_{stg}	Storage temperature	
P_C	Constant or average power of collector	$P_C \approx U_{CE} I_C$
P_{tot}	Total power	$P_{tot} = U_{CE} I_C + U_{BE} I_B$
R_{thja}	Total heat resistance (heat resistance between junction and environment)	Ratio of difference between temperatures of PN junction and environment to power dissipated from transistor in steady state
R_{thjc}	Intrinsic heat resistance (heat resistance between junction and case)	Ratio of difference between temperatures of PN junction and transistor case to power dissipated from transistor in steady state

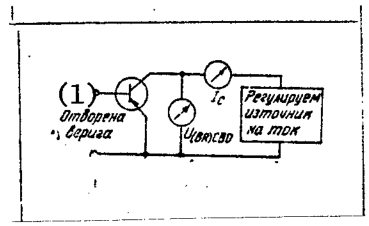
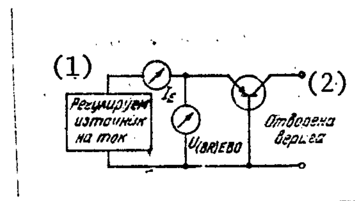
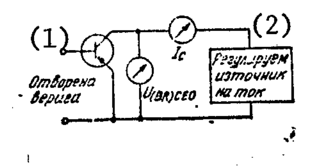
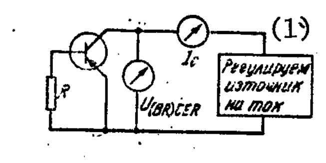
Static Parameters

U_{CB}	Collector-base voltage	 Key: 1. Source
U_{CE}	Collector-emitter voltage	 Key: 1. Source
U_{EB}	Emitter-base voltage	 Key: 1. Source
U_{BE}	Base-emitter voltage	 Key: 1. Source
U_{CBO}	Collector-base voltage given $I_e=0$ and a certain value of I_e	 Key: 1. Open circuit 2. Source

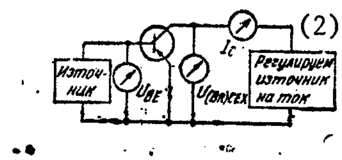
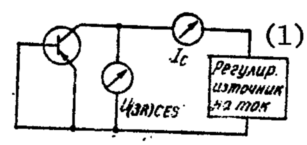
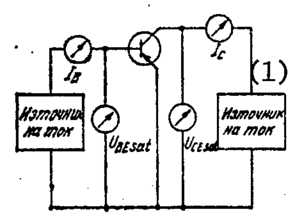
Static Parameters (continued)

U_{EBO}	Emitter-base voltage given I_C=0 and a certain value of I_E	 Key: 1. Source 2. Open circuit
U_{CEO}	Collector-emitter voltage given I_B=0 and a certain value of I_C	 Key: 1. Open circuit 2. Source
U_{CER}	Collector-emitter voltage when resistance is connected between base and emitter and given a certain value of I_C	 Key: 1. Source
U_{CEX}	Collector-emitter voltage given reverse voltage between base and emitter and a certain value of I_C	 Key: 1. Source
U_{CES}	Collector-emitter voltage given U_{BE}=0 and a certain value of I_C	 Key: 1. Source

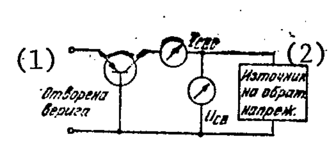
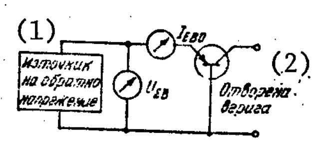
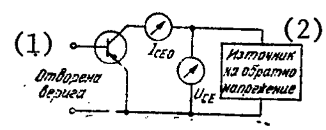
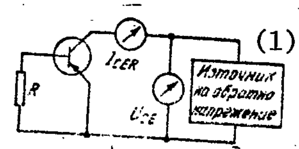
Static Parameters (continued)

$U_{(BR)CBO}$	Breakdown collector-base voltage given I_E= 0 and a certain value of I_C	 Key: 1. Open circuit 2. Controlled current source
$U_{(BR)EBO}$	Breakdown emitter-base voltage given I_C=0 and a certain value of I_E	 Key: 1. Controlled current source 2. Open circuit
$U_{(BR)CEO}$	Breakdown collector-emitter voltage given I_B=0 and a certain value of I_C	 Key: 1. Open circuit 2. Controlled current source
$U_{(BR)CER}$	Breakdown collector-emitter voltage when resistance is connected between base and emitter and given a certain value of I_C	 Key: 1. Controlled current source

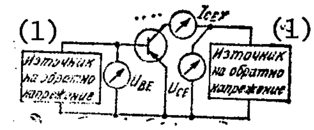
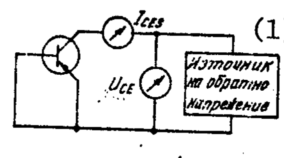
Static Parameters (continued)

$U_{(BR)CEX}$	Breakdown collector-emitter voltage given reverse voltage between base and emitter and given a certain value of I_C	 Key: 1. Source 2. Controlled current source
$U_{(BR)CES}$	Breakdown collector-emitter voltage given a short in base-emitter circuit and a certain value of I_C	 Key: 1. Controlled current source
U_{CEsat}	Collector-emitter saturation voltage given a certain value of I_C and I_B	 Key: 1. Current source
U_{BEsat}	Base-emitter saturation voltage given a certain value of I_C and I_B	
I_C	Collector current	
I_E	Emitter current	
I_B	Base current	

Static Parameters (continued)

I_{CBO}	Reverse collector current given I_E=0 and a certain value of U_{CB}	 Key: 1. Open circuit 2. Inverse voltage source
I_{EBO}	Reverse emitter current given I_C=0 and a certain value of U_{EB}	 Key: 1. Inverse voltage source 2. Open circuit
I_{CEO}	Reverse collector-emitter current given I_B=0 and a certain value of U_{CE}	 Key: 1. Open circuit 2. Inverse voltage source
I_{CER}	Initial collector current when resistance is connected between base and emitter and given a certain value of U_{CE}	 Key: 1. Inverse voltage source

Static Parameters (continued)

I_{CEX}	Initial collector current given inverse voltage between emitter and base and a certain value of U_{CE}	 Key: 1. Inverse voltage source
I_{CES}	Initial collector current given a short in base-emitter circuit and a certain value of U_{CE}	 Key: 1. Inverse voltage source

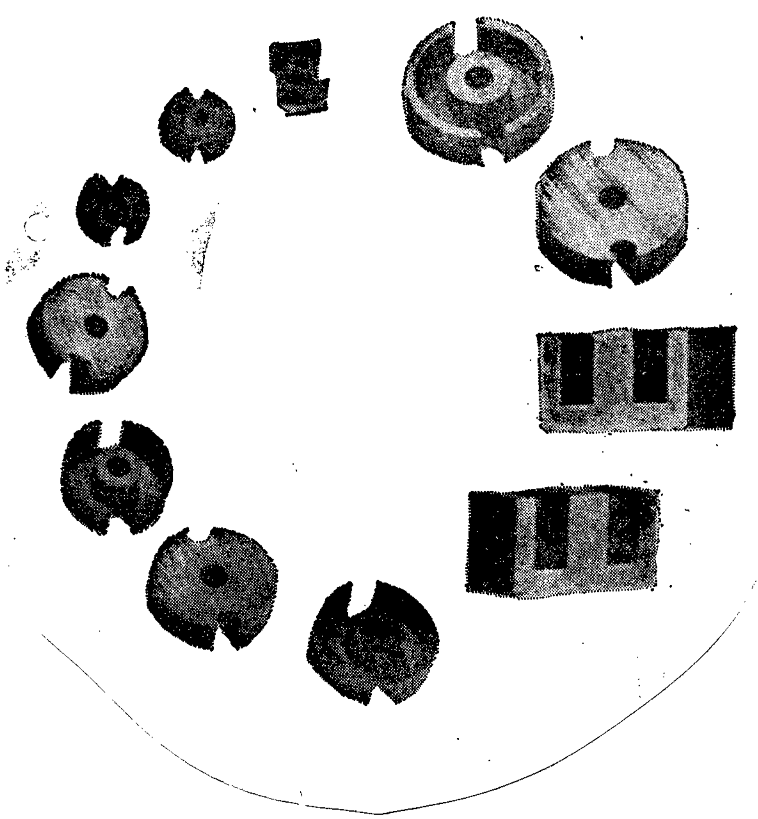
6474
CSO: 2202

LIST OF MAGNETIC FERRITES PRODUCED AT PERNIK PLANT

Sofia RADIO, TELEVIZIYA, ELEKTRONIKA in Bulgarian No 4, 1977, inside and outside back covers

[Unattributed article: "Magnetically Soft Ferrites for Long-Distance Communication Equipment and for Radio and TV Receivers"]

[Text] Magnetically Soft Ferrites for Long-Distance Communication Equipment Produced at Pernik Ferromagnet Plant

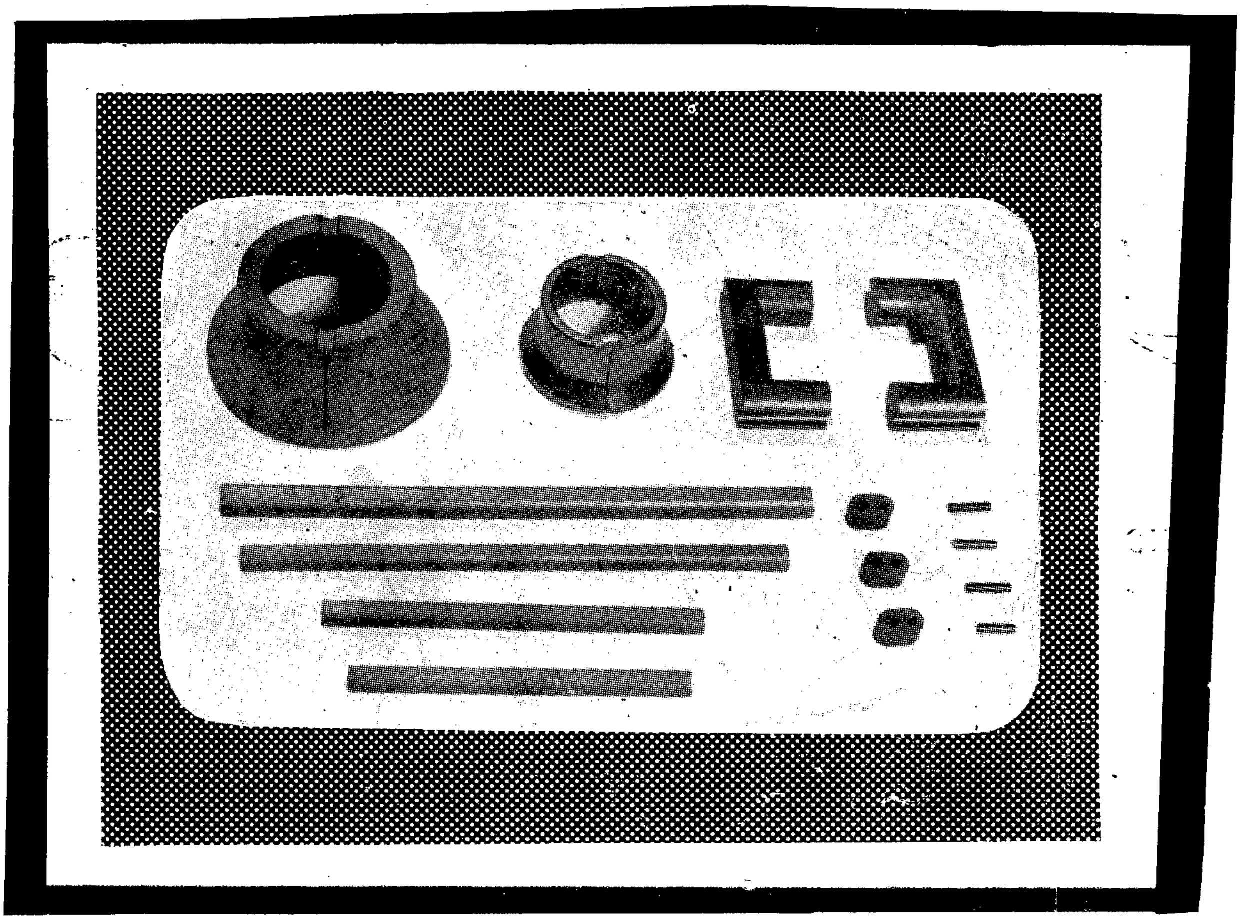


Електромагнитни параметри (1)	(2) Димензия / (3) Материал	M800	M1400	M2000—1	M2000—2	M3000	M10000
Начална магнитна проницаемост $\mu_{нач}$ (4)		800	1400	2000	2000	3600	10000
Относителен тангенс на ъгъла на загубите $tg\ \delta/\mu_{нач}$ (5)	$\times 10^{-6}$	≤17	≤6	≤3,5	≤3,5	≤10	≤10
Честотен обхват (6)	MHz	0,2÷2	0,01÷0,3	0,01÷0,3	0,01÷0,3	0,01÷0,2	0,1
Честота на измерване (7)	MHz	0,5	0,1	0,1	0,1	0,1	0,1
Относителен температурен коефициент α_M (8)	$\times 10^{-6}$	−0,6÷2	0,8÷1,8	0÷2,5	−1,2÷1,2 −0,6÷1,2	0,6÷2,0	0,5÷2,0
Температура на Кюри T_c (9)	°K	473	403	403	423	403	383
Магнитна индукция на насищане B_{ms} (10)	T	≥0,36	≥0,34	≥0,35	≥0,34	≥0,40	≥0,36
Напрегнатост на магнитното поле H_{ms} (11)	kA/m	1,2	1,2	1,2	1,2	1,2	1,2
Коерцетивна сила H_c (12)	kA/m	0,12	0,04	0,024	0,04	0,01	0,08
Фактор на дезакомудация D_E (13)	$\times 10^{-6}$	≤15	≤4,6	≤3	≤4	≤3	≤3
Приложение (14)		P18×11 P18×14 FR14 P14×8	P11×7 P14×8 P18×14 P22×13 P26×16 P30×19	P14×8 P18×11 P18×14 P22×13 P26×16 P30×19	R−6 FR−14 P14×8 P18×11	P9×5 P11×7 P14×8 P18×14 P22×13 P26×16 P30×19 P36×22 E20,E42	P22×13 FR−14 R−6

Key:

1. Electromagnetic parameters
2. Dimension
3. Material
4. Initial magnetic permeability μ_{init}
5. Relative tangent of loss angle $tg\ \delta/\mu_{init}$
6. Frequency range
7. Measurement frequency
8. Relative temperature coefficient α_M
9. Curie temperature T_c
10. Magnetic saturation induction B_{ms}
11. Magnetic field intensity H_{ms}
12. Coercive force H_c
13. Disaccommodation factor D_E
14. Application

Magnetically Soft Ferrites for Radio and TV Receivers



They find application in the production of ferrite antennas, cones for transformers, toroids, cup-shaped cores, deflection systems for black-and-white and color TV etc.

They are produced by ceramic-technology methods at the Pernik Ferromagnet Plant.

(1) Електромагнитни параметри	12 Дименсия / 13 Материал	14 Ф10	Ф17	Ф25	Ф50	Ф100—1	Ф100—2	15 НФ250	НФ300	НФ550	16 МФ1000	16 МФ2500
(2) Начална магнитна проницаемост $\mu_{нач}$		10	17	25	50	100	100	250	300	550	1000	2500
(3) Относителен тангенс на ъгъла на загубите $tg\,\delta/\mu_{нач}$	$\times 10^{-6}$	≤ 750	≤ 500	≤ 200	≤ 90 ≤ 250	≤ 400 ≤ 1000	≤ 40 ≤ 100	≤ 40 ≤ 100	≤ 25 ≤ 60	≤ 30 ≤ 90	≤ 15	≤ 13
(4) Честотен обхват	MHz	10÷200	10÷150	3÷80	0,5÷30	0,3÷2,0	0,4÷20	0,1+2,0	0,4÷20	0,1÷2,0	0,01÷0,4	0,01÷0,4
Честота на измерване (5)	MHz	10	10	3	0,5 30	0,3 18	0,5 20	0,4 2	0,4 2	0,1 2	0,1	0,1
Относителен температурен коефициент α_μ (6)	$\times 10^{-6}$	40÷110	30÷120	30÷70	25÷65	15÷35	5÷12	5÷15	15÷35	15÷35	—0,5÷5	2÷2,8
Температура на Кюри T_c (7)	°K	623	628	623	573	573	573	378	378	398	443	473
Магнитна индукция на насищане B_{ms} (8)	T	$\geq 0{,}15$	$\geq 0{,}10$	$\geq 0{,}2$	$\geq 0{,}3$	$\geq 0{,}3$	$\geq 0{,}25$	$\geq 0{,}2$	$\geq 0{,}25$	$\geq 0{,}25$	$\geq 0{,}35$	$\geq 0{,}45$
Напрегнатост на магнитното поле H_{ms} (9)	kA/m	2,4	2,4	2,4	2,4	1,2	1,2	1,2	1,2	1,2	1,2	1,2

Цена 0,30

[For key, see next page]

Key:

1. Electromagnetic parameters
2. Initial magnetic permeability μ_{init}
3. Relative tangent of loss angle tg δ/μ_{init}
4. Frequency range
5. Measurement frequency
6. Relative temperature coefficient α_{μ}
7. Curie temperature T_c
8. Magnetic saturation induction B_{ms}
9. Magnetic field intensity H_{ms}
10. Coercive force H_c
11. Application
12. Dimension
13. Material
14. F10, F17, F25, F50, F100-1, F100-2
15. NF 250, NF300, NF 550
16. MF1000, MF2500
17. Smooth and threaded cores
18. Smooth ferrite cores
19. Smooth threaded cores, ferrite cups
20. SFTs, ChF, SFNT, SFT
21. ChFM, threaded cores
22. ChFM
23. Antennas SFTs and MFM
24. SFTs, VCh [high-frequency] choke
25. SFTs, deflection block E-42
26. U-57, 45, 59 magnetophone heads

6474
CSO: 2202

NEW BRAKE FLUID USED BY ARMY VEHICLES DESCRIBED

Sofia VOENNA TEKHNIKA in Bulgarian No 5, 1977 pp 10-11

[Article by Engineer Lt Col Petko Georgiev, Engineer Col Georgi Grigorov, and Engineer Capt Ivan Papazov: "New Brake Fluid and Its Use in the Bulgarian People's Army"]

[Text] Reliable operation of motor-vehicle braking systems depends exclusively on the quality of the brake fluid used. In recent years glycol-ether-based brake fluids have been widely employed.

A new brake fluid was put into use in our country, including the Bulgarian People's Army, in 1977 under Bulgarian State Standard 9400-72. In its qualities it meets the specifications of RS 1305-68 and is the equivalent of Lz-TZh-2 "Neva" produced in the USSR.

The new brake fluid contains glycol ethers and glycols as solvent, synthetic lubricants, corrosion inhibitors and antioxidant additives.

This brake-fluid composition gives it very good physicochemical properties. It is characterized by good lubricating and low-temperature properties; it does not form steam bubbles, nor does it foam during operation; it does not corrode the metals or alloys of the braking systems and does not attack the rubber seals (collars); it possesses good stability at high and low temperatures -- it does not stratify or form deposits.

The viscosity of the new brake fluid and the presence of synthetic lubricants assure good lubrication of braking systems at high temperatures. At low temperatures viscosity remains low (at -40° C it does not exceed 1800 sq mm per sec), which assures easy and rapid return of the piston of the braking system to the initial position.

The viscosity of the brake fluid is defined according to Bulgarian State Standard 8572-71.

To assess the stability of the fluid at low temperatures, and especially in cases where moisture is absorbed, appropriate tests are conducted. The compatibility of brake fluid with water is determined in the following way: 100 ml of fluid is mixed with 3.5 ml of water and let stand 22 ± 2 hours at -40° C. This mixture must remain transparent after the test and no deposits must have formed in it. On inversion of the test-tube in which the test is conducted, an air bubble must pass through the entire layer in not more than 10 seconds.

Stability at high temperatures is determined by heating a sample to 60° C for 22 ± 2 hours, after which the fluid must remain transparent, must not have stratified or have formed more than 0.05% (by volume) deposits.

The new brake fluid possesses good anticorrosion properties. These are attained by means of effective corrosion inhibitors. To assess them, appropriate testing is conducted with standard metal plates (steel, aluminum, cast iron, brass, copper) immersed in 400 ml of brake fluid containing 20 ml of water. They are heated to 100° C and let stand for 120 hours. The decrease in their weight in mg per sq cm does not exceed the relevant norms of the standard.

The brake fluid according to Bulgarian State Standard 9400-72 does not cause swelling of the rubber seals in the braking systems; it does not attack or harden them. Insignificant swelling of the rubber collars conduces to better sealing of the braking system and a lessening of the danger of leakage and loss of brake fluid.

The swelling test is defined according to Bulgarian State Standard 8573-71. It is conducted for 120 hours at 70° C. Following the test, the increase of the diameter of the collar in mm is determined. In addition, it must not become hard or sticky. For this purpose, standard rubber collars are used.

An important requirement for brake fluids is the following: loss by evaporation must not exceed 80 percent and what remains thereafter must not be viscous and deposits must not have formed in it. Otherwise, the fluid for lubricating the piston and cylinder that has passed through the rubber seal and is subject to the effect of high temperature evaporates, and the inhibitor remains on the surface as a solid mass. This can lead to failure in the operation of the braking system. The new brake fluid is characterized by low evaporativity and the residue after evaporation is fluid and has no deposits.

The evaporation test is conducted according to Bulgarian State Standard 8563-71. In the braking process, as is known, kinetic energy is converted into heat. The braking disks on repeated or continuous braking (during a descent on inclined roads) can become heated until red hot. The released heat heats the brake fluid. Its temperature can go as high as $180\text{-}200^{\circ}$ C.

The fluid must be stable under such great thermal stress; it must not form steam bubbles or cracked gas. These impair the operation of the braking system.

The new brake fluid possesses excellent thermal stability and a comparatively high boiling point.

In a weakly alkaline medium, the tendency of metals to corrode is known to be insignificant. That is why the pH (concentration of hydrogen ions) of brake fluids ranges between 7.0 and 11.5. It is determined according to Bulgarian State Standard 8583-71 by means of a glass electrode.

The physicochemical indicators of the new brake fluid are compared with those of "Neva," as well as with the specifications of RS 1305-68, in the table.

In its operational qualities the new brake fluid considerably surpasses the fluid now used and replaces it completely. In addition it replaces "Neva" brake fluid and fluids meeting SAE-70R_3.

It is intended for the braking systems of the following: Moskvich passenger cars -- all models, "Volga" GAZ [Gorkiy Automobile Plant] -- all models, the "Lada" ("Zhiguli") -- all models, the GAZ (UAZ [Ural Automobile Plant]) -- all models, the Skoda -- all models etc.; trucks and special motor vehicles: Nisa, Zhuk, Barkas, Latviya, ZIL [Moscow Automobile Plant imeni I. A. Likhachev] -- all models with fluid braking systems, GAZ -- all models, Ural -- all models etc.

Mixing the new brake fluid with, or adding it to other makes is prohibited.

During storage, special attention must be given to the airtightness of the container due to the high hygroscopicity of the fluid. Storage life of the brake fluid is three years. Well organized storage of brake fluid and expert use of it are a guarantee of troublefree operation of braking systems.

Table

PHYSICOCHEMICAL INDICATORS OF NEW BULGARIAN BRAKE FLUID -- BULGARIAN STATE STANDARD 9400-72

(A) № по ред	(B) Показатели	(C) Спирачна течност по БДС 9400—72	(D) ЛЗ—ТЖ-2 „НЕВА“	(E) Норма по РС—1305—68	(F) Норма по ФИАТ ВАЗ
1	Външен вид	Прозрачна, еднородна течност, без утайка. Допуска се слаба опалесценция.			
2	Цвят	Зелен	Жълт	—	—
3	Кинематичен вискозитет, в mm^2/s				
	— при минус 40°C, не повече от	1800	1500	1800	1800
	— при 50°C, не по-малко от	4,2	5	4,2	4
	— при 100°C, не по-малко от	1,5	2	—	1,5
4	Температура на кипене, в °C, не по-малко от	190	180	190	190
5	Пламна температура в открит тигел, в °C, не по-малко от	82	85	82	85
6	pH	от 7,5 до 11,5	от 7,5 до 11,5	от 7,5 до 11,5	от 7,5 до 11,5
7	Устойчивост на висока температура (температура на кипене след нагряване при 185±2°C в продължение на 2h, в °C, не по-малко от	188	—	—	—
8	Загуби при изпарение при 100±2°C до постоянна маса (не повече от 7 денонощия) в %, не повече от	80	—	—	—
	— температура на застиване на остатъка, в минус °C, не повече от	—	-5	—	-5
9	Загуби от корозия при изпитване на еталонни метални пластинки (120 часа при 100°), в mg/cm^2 не повече от:				
	— за калайдисана стомана	0,2	—	—	0,2
	— за стомана	0,2	0,2	0,2	0,2
	— за алуминий (сплави)	0,1	0,1	0,1	0,1
	— за чугун	0,2	0,2	0,2	0,2
	— за месинг	0,4	0,5	0,4	0,5
	— за мед	0,4	0,5	0,4	0,5
10	Изпитание с еталонно гумено пробно тяло (маншета) при 70°C при продължение на 120 h (увеличение диаметъра на маншетите), в mm	от 0,15 до 1,4	3—12*	—	12*

[Key at end of Table]

PHYSICOCHEMICAL INDICATORS OF NEW BULGARIAN BRAKE FLUID -- BULGARIAN STATE STANDARD 9400-72 (continued)

11	Нискотемпературни свойства. След охлаждане при минус 40°С, в продължение на 6 денонощия:				
	— външен вид	Прозрачна течност, без разслоение и утайка			
	— време за преминаване на мехурче въздух през слой от течността в секунди, не повече от	10	10	5**	10
	След охлаждане при минус 50°С, в продължение на 6 часа:				
	— външен вид	Прозрачна течност, без разслоение и утайка			
	— време за преминаване на мехурче въздух през слой от течността, в секунди не повече от	35	—	35	25—30
12	Съвместимост на спирачната течност с 3,5% вода.				
	След охлаждане при минус 40°С, в продължение на 22±2 часа:				
	— външен вид	Прозрачна течност, без разслоение и утайка			
	— време за преминаване на мехурче през слой от течността, в секунди, не повече от	10	—	—	—
	След нагряване при 60°С, в продължение на 22±2 часа:				
	— външен вид	Прозрачна течност, без разслоение и утайка			
	— количество на утайката, в обемни %, не повече от	0,05	—	—	—

* Набъбване на детайли от каучук (ТХ—120—60) в продължение на 120 h при 120°С, в обемни проценти.

** Течността трябва да започне да тече не по-късно от 5 секунди след обръщане на цилиндъра от вертикално в хоризонтално положение.

*Swelling of rubber parts (TKh-120-60) for 120 hours at 120° C, in volume percents.

**Fluid must begin to flow not later than 5 sec after cylinder is turned from vertical to horizontal position.

[For key, see next page]

Key:

A. Serial No.

B. Indicators

1. External appearance
2. Color
3. Kinematic viscosity, in sq mm per sec
   -- at -40° C, not more than
   -- at 50° C, not less than
   -- at 100° C, not less than
4. Boiling point, in $^\circ$C, not less than
5. Flame temperature in open crucible, in $^\circ$C, not less than
6. pH
7. Resistance to high temperature (boiling point on heating at $185\pm2^\circ$ C for 2 hr, in $^\circ$C, not less than
8. Losses during evaporation at $100\pm2^\circ$ C to a constant mass (not more than 7 24-hour periods) in %, not more than:
   -- solidification point of residue, in $-C^\circ$, not more than
9. Corrosion losses during testing of standard metal plates (120 hr at 100° C), in mg per sq cm, not more than:
   -- for tin-plated steel
   -- for steel
   -- for aluminum (alloys)
   -- for cast iron
   -- for brass
   -- for copper
10. Test with standard rubber test-piece (collar) at 70° C for 120 hr (increase of diameter of collars), in mm
11. Low-temperature properties. After cooling at -40° C for 6 24-hr periods:
   -- external appearance
   -- time required for air bubble to pass through layer of fluid in seconds, not more than

   After cooling at -50° C, for 6 hr:
   -- external appearance
   -- time required for air bubble to pass through layer of fluid, in seconds, not more than
12. Compatibility of brake fluid with 3.5% water.

   After cooling at -40° C for 22 ± 2 hr:
   -- external appearance
   -- time required for bubble to pass through layer of fluid, in seconds, not more than

   After heating at 60° C for 22 ± 2 hr:
   -- external appearance
   -- amount of deposit, in volume %, not more than

Key (continued):

C. Brake fluid according to Bulgarian State Standard 9400-72

1. Transparent, homogeneous fluid; no deposit. Weak opalescence permissible
2. Green
6. from 7.5 to 11.5
10. from 0.15 to 1.4
11. Transparent fluid, no stratification or deposit.
    Transparent fluid, no stratification or deposit.
12. Transparent fluid, no stratification or deposit.
    Transparent fluid, no stratification or deposit.

D. LZ-TZh-2 "NEVA"

2. Yellow
6. from 7.5 to 11.5

E. Norm according to RS-1305-68

6. from 7.5 to 11.5

F. Norm for FIAT VAZ

6. from 7.5 to 11.5

6474
CSO: 2202

COMPUTERIZATION STATISTICS COMPILED

Budapest NEPSZABADSAG in Hungarian 10 Aug 77 p 10

[Article by "a correspondent"]

[Text] A statistical compilation and a study analyzing in detail the status of computerization in Hungary as of the end of 1976 has recently been comppleted by the National Computer Technology Application Bureau (OSZI) of the Hungarian Statistical Office. We will use these studies to review the most important data and relationships.

At the end of 1976, a total of 454 computers were in use in Hungary; in addition, there were 239 devices which the experts classify as so-called minicomputers. The wider proliferation of computer technology is illustrated by the fact that the number of computers in 1976 is almost four times as high as that in 1970. Another manner in which the computerization may be characterized is to calculate the number of computers per one million inhabitants. According to the analysis of the OSZI, this number is 45 as of the end of 1976 in Hungary. This is a modest figure since, for example, the corresponding figures are 1.5-2 times higher in Czechoslovakia and East Germany. In the developed capitalist countries, the degree of "computerization" is even higher.

Where do our computers come from? There has been a major change in the composition of our computer complement since the Fourth Five-Year Plan. We have computers from many sources, bought in a number of countries, although since the promulgation of the central computer technology development program we became somewhat more consistent. Before the emergence of the computers from the Unified Computer Technology System (ESZR), set up by six socialist countries (Bulgaria, Czechoslovakia, Poland, Hungary, East Germany, and the Soviet Union), we tended to buy computers from capitalist countries, and we attempted to select those which could be operated with program languages similar to those used in the above-mentioned CEMA countries. Since 1973 —

which was the time of the appearance of the ESZR units on the market — such equipment practically dominated our purchases.

Insofar as the use of the computers is concerned, we still feel the effects of the "base period," which as a matter of fact ended not so long ago, during which the share of the educational and research institutions was large. (Today, such institutions still account for approximately 26 percent.) The number of computers installed in enterprises is increasing: whereas there were 27 computers used in industry in 1970, there were 127 in 1976. Within the same period, the number of computers in the construction industry increased from five to 22; in commerce from five to 22; in transportation and communications from seven to 24. There was even an increase of sorts in the water-management field, where there was no computer as late as 1972: there were seven in the end of 1976.

Insofar as the degree of utilization of the computers is concerned, we have data only for 265 computers, which were among the 382 computers inventoried at the end of 1975. For these, we have data for a one-year period. According to these data, the average operating time of the regularly used computers was almost two full shifts per day, and within this, the productive computer-hour utilization was 72.7 percent. According to international data, the use of the computers is optimal if they are used at a rate corresponding to 66-75 percent of a three-shift time base. Obviously, we are still far from this.

The total computer-hour usage in Hungary was almost one million hours; this is more than four times higher than the corresponding figure for 1970. Within this framework, there has been a slight decrease in the number of computer-hours used for scientific, mathematical, administrative, and operations research applications. There has been a slight increase in applications such as wage calculations, billing, organizational projects, and the like — their percentage was high to start with — and there has been a major increase in the application of computers in stock management (from 5 to 11.1 percent).

We do not use computer technology sufficiently in the control of technological processes: we expended only 3 percent of the total computer-use hours for this purpose in 1976. The primary reason for this was that process control is one of the most highly complex and expensive among all applications. Also, such applications have the difficult-to-achieve prerequisite that the plants and staff members are capable and ready to adapt themselves to the use of computer technology. This, in turn necessitates thorough comprehension of the technological processes, high degree of instrumentation, and automation. Engineering work is too little computerized also, even though there are many useful static, building-engineering, circuit-designing, geodetic, and similar programs available.

There are also too few data teleprocessing facilities in Hungary, which could be used in conjunction with the computers for such purposes as data acquisition, data transmission, and so forth. Some of these devices appeared only in recent years. The gross value of the data teleprocessing equipment as of the end of 1975 was barely 100,000,000 forints, whereas the gross value of the operating computers was 7.5 billion forints.

The number of computer centers increased from 58 to 236 during the period covered by the study. This is a major improvement since the time base is much better utilized in these centers, which usually operate more modern and more productive equipment, and since the centers accept contract work which makes them more efficient.

It is also worthy of note that there are now 4,325 machines for the preparation of the data for the computers, which represent very useful and important equipment. This number, representing the situation as of the end of 1975, is almost 7.5 times higher than the corresponding number for 1970. Within this number, there is an increasing percentage of modern magnetic-tape equipment. However, the number and productivity of the computers grew faster than the data-recording capacity. Also, we face a shortage of experts in the field of data preparation and recording.

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HUNGARY

BRIEFS

APPLICATION TO PURCHASE CYCLOTRON--The presidium of the Academy of Sciences supports the recommendation for the purchase of a cyclotron having a pole diameter of 103 centimeters, because such a piece of equipment is essential for basic and applied research as well as for solution of practical problems. The presidium asks the first secretary of the Academy, the chairman of the National Technical Development Committee, the chairman of the National Atomic Energy Committee to make a joint presentation to the Science Policy Committee, since the purchase price of the cyclotron is in excess of 100 million forints. [Budapest AKADEMIAI KOZLONY in Hungarian 2 Aug 77 p 108]

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END